

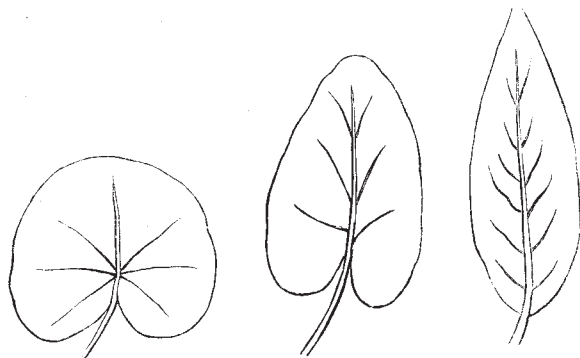
fairly conclude, therefore, that pinnate venation is best adapted to very long leaves, both because of the support it gives to the cellular mass and because of the easy manner in which it distributes sap to every part alike.

It seems also probable that pinnate ribs are especially adapted to forest trees. Most of these indeed have their leaves rather long in outline—like the ash, the oak, the chestnut, the walnut, the mountain ash, the laurels, the hornbeam, and the willow—while others in which the primary ribs are palmate—like the horse-chestnut and

resemblance produced by an identical environment. By the interaction of the two factors we must endeavour to explain every particular form of leaf. To do this throughout the whole vegetable kingdom would be of course an endless task, but to do it in a few selected groups is both a practicable and a useful botanical study. The ground-plan will always depend upon the ancestral type; the outline, degree of segmentation, and minuteness of cutting, will always depend upon the average supply of carbonic acid and sunlight.

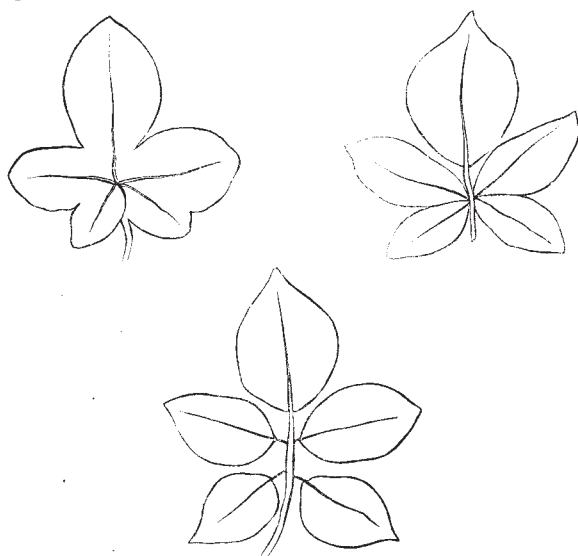
GRANT ALLEN

(To be continued.)



FIGS. 28, 29, 30.—Gradation from palmate to pinnate venation.

the plane—have their secondary ribs pinnate and their lobes or leaflets very long, so that the total effect is in the end pretty much the same. But even when the leaf is rather shortened in general outline, as in the elm, the beech, the alder, and the poplar, the venation is still pinnate. Doubtless this form of ground-plan protects the leaves of these exposed trees best against the wind; and where the leaflets are much subdivided, as in the acacias, the subdivision may be regarded as a protection against severe storms.



FIGS. 31, 32, 33.—Gradation from palmate lobes to pinnate leaflets.

The shapes of leaves in each particular species of plant thus depend in ultimate analysis upon two factors: first, the ancestrally-inherited peculiarities of type and venation; and second, the actual conditions to which the species is now habitually exposed. Accordingly, under the same conditions, a monocotyledon and a dicotyledon will tend to assume approximately similar general external forms; but their underlying ancestral peculiarities may generally be perceived through the mere analogical

## NOTES

SIR JOHN LUBBOCK did right to ask the Prime Minister on Monday, whether, in remodelling the department of the Lord President of the Council, he would consider the desirability of separating the actual Minister of Education in the House of Commons from that office, and of transferring to him the power of appointing the inspectors and other officers on whom the satisfactory working of the education of the country so greatly depends. As might have been expected, Mr. Gladstone held out no hope of any change being made for a long time; that, however, is no reason why the efforts of the friends of science and education in this direction should cease.

THE Grocers' Company have issued a scheme for the encouragement of original research in sanitary science. It consists of two forms of endowment: the one, meant as maintenance for work in progress, in fields of research to be chosen by the worker himself; the other, meant as reward for actual discovery in fields of research to be specified from time to time by the Company. With the former intention the Company establishes three Research Scholarships, each of 250*l.* a year; with the latter intention they appoint a Discovery Prize of 1000*l.*, to be given once in every four years. The Research Scholarships are intended as stipends for persons engaged in making exact researches into the causes of important diseases, and into the means by which the respective causes may be prevented or obviated. The Court of the Company propose to appoint to two of the scholarships in May, and to a third in May, 1884. The Discovery Prize is intended to reward original investigations, which shall have resulted in important additions to exact knowledge, in particular sections of sanitary subject-matter. The Court will, once in four years, propose some subject for investigation; and the first subject will be announced in May.

THE Annual Report of the City and Guilds of London Institute, taken in conjunction with the Annual Meeting held last week, shows that technical education has taken firm root and is making rapid progress in this country. Though hardly yet so universal as on the Continent, there is every reason to believe that it soon will be, and Lord Selborne, who presided at the Annual Meeting, was justified in congratulating the Institute on its success. As the *Times*, in a sensible article on the Annual Meeting, says: "Lord Selborne did not dwell at length upon the general aspects of technical education. He assumed, and he had good reason to assume, that the need for a systematic development of it is proved beyond question, and is almost universally accepted. No observer now doubts that if the English artisan is to hold his ground in the struggle for existence, he must be kept up to the mark by proper teaching; and no one who has at heart the moral well-being of the working classes doubts the enormous importance of giving them an insight into principles and processes which will raise their work as much as possible out of the mere mechanical groove."

THE following are the arrangements for the lectures after Easter at the Royal Institution:—Prof. J. G. McKendrick, ten lectures on physiological discovery; Dr. Waldstein, four lectures on the

art of Pheidias; Prof. Tyndall, three lectures on Count Rumford, originator of the Royal Institution; Mr. R. J. Poole, three lectures on recent discoveries in (1) Egypt, (2) Chaldaea and Assyria, (3) Cyprus and Asia Minor; Mr. A. Geikie, six lectures on geographical evolution; and Prof. C. E. Turner, four lectures on historical sketches of Russian social life. The discourses on the Friday evenings will be as follows:—April 6, Dr. Archibald Geikie, F.R.S., The Cañons of the Far West; April 13, Dr. Waldstein, The influence of athletic games on Greek art; April 20, Prof. Bayley Balfour, The island of Socotra and its recent revelations; April 27, Dr. C. William Siemens, F.R.S., Some of the questions involved in solar physics; May 4, Robert H. Scott, F.R.S., Weather knowledge in 1883; May 11, Prof. Huxley, V.P.R.S., Oysters and the oyster question; May 18, Prof. C. E. Turner, of the University of St. Petersburg, Kustarnoe proizvodstvo: or, the peculiar system of domestic industry in the villages of Russia; May 25, Prof. Flower, F.R.S., Whales, present and past, and their probable origin; June 1, Frederick Pollock, LL.D., The sword: its forms and its history; June 8, Prof. Dewar, F.R.S.

IN reference to the course of ten lectures on physiological discovery, to be given at the Royal Institution on Tuesdays, beginning April 3, by Prof. J. G. McKendrick, we may say that the object of the course will be to trace the progress of physiological research from about the beginning of the sixteenth century to recent times, and more especially along those lines which have led to great results. Admitting that the deepest foundation of physiological science is a knowledge of structure, both of organ and of tissue, it will be the aim to show how physiology has gradually attempted to solve some of its problems by the methods of physics and of chemistry, and has thus become a branch of experimental science. The method followed will be to describe briefly the lives of the great discoverers, to indicate the influence of contemporary science on their ideas and opinions, and to show how their labours have brought us to our present position. As far as possible, the fundamental experiments of discoverers will be shown or illustrated, and these will be compared with present methods.

BARON NORDENSKJÖLD, having inspected the Royal Mail Steamer *Sophia*, which the Government have asked the Swedish Parliament to lend for his expedition to Greenland, finds that the vessel is not large enough to carry the quantities of coals and provisions required, although very suitable in other respects. He has therefore decided that a vessel shall be despatched from Denmark with these requisites, and depots established in convenient places on the coast. The *Sophia* will be overhauled and fitted for her voyage in Gothenburg, and as her commander Capt. Nilsson, of that city, has been selected.

THE position of the Lena Meteorological Station is  $73^{\circ} 22' 30''$  N. lat. and  $126^{\circ} 34' 55''$  E. long. The house erected there for the observers is reported to be quite comfortable, and the health of the expedition is satisfactory.

THE group of fishing Chukches, which Baron Nordenskjöld has prepared from materials collected in the *Vega* expedition for the coming Fisheries Exhibition, is now on view in Stockholm.

WITH the completion of the buildings in which the varied collection of the great International Fisheries Exhibition is to be housed, the preparatory work of the executive committee is drawing to an end. Not much remains to be done to the buildings which now almost cover the southern half of the Horticultural Society's gardens, and the nature and distribution of the exhibits may now be approximately given. Before handing over to the care of representatives of the colonies and of foreign Powers the places allotted to their countries, the committee on Friday invited members of both Houses of Parliament

and their friends to see the buildings. To add to the interest of the aquaria, Lord Walsingham has offered to let off a lake, of about seventy-two acres in extent, on his estate at Merton, in Norfolk, and to send all the fish worth forwarding alive, and besides pike, perch, tench, and other coarse fish, he promises 1000 specimens of the celebrated golden tench. Additional value will be given to the natural history department by the exhibition in a building near the new Natural History Museum of the fine collection of fish preserved in spirit now to be brought from Bloomsbury. In order to make the exhibition as truly popular as could be desired, it will be kept open in the evening, and brilliantly lighted by electricity.

AT the installation of Mr. Bright to-day as Lord Rector of Glasgow University, the degree of LL.D. will be conferred on Dr. Joseph H. Gilbert, F.R.S., and Prof. Fleeming Jenkin.

ON February 26 there was discovered in the snow in several places in Trondhjem Amt, in North Norway, a fine dust, which, it was believed, originated from the Iceland volcanoes, such an occurrence having taken place in 1876. Dr. H. Reusch, of the Mineralogical Faculty of Christiania University, having examined the samples forwarded to him, now states, however, that the dust is not of an eruptive nature, but consists of common sand, fine stones, quartz, hornblende, and talc, mixed with very fine particles of vegetable matter. The phenomenon is nevertheless very remarkable, as the dust must have been carried a very long distance, the whole of the country having for months been covered with deep snow. The dust fell over a district of several degrees. The wind blew strongly from north-north-west.

ON the night of the 4th inst. there was observed in Gestrike-land, in Sweden, a display of aurora borealis, the extent, vividness, and magnitude of which, it is reported, has not been observed in that country for years. An interesting feature of the phenomenon was that the big clouds, which from time to time passed below the aurora, did not in the slightest degree affect the phenomenon.

A TELEGRAM from Messina states that on the afternoon of March 20 a shower of small stones began to fall, proceeding from an eruption of Mount Etna. The atmosphere was thick and dark.

PROF. VIRCHOW has started on a journey to Sicily, whither he goes for archaeological purposes. He contemplates returning in two months.

A COMMUNICATION from Dr. Joule, F.R.S., was read at a recent meeting of the Manchester Literary and Philosophical Society, on the use of lime as a purifier of the products of combustion of coal gas. The slaked lime is placed in a vessel the bottom of which, about one foot diameter, is slightly domed and perforated with fine holes. The vessel is suspended about six inches above the burner. It is found that a stratum of four or five inches of lime is sufficient to remove the acid vapours so far as to prevent them from reddening litmus paper. The lime seems in many respects to present important advantages over the zinc previously recommended.

MR. ELLIS LEVER has offered a prize of 500*l.* for a new miners' safety lamp, and has requested the Council of the Society of Arts to appoint one of the judges to award the prize. In accordance with this request, the Council have appointed Prof. F. A. Abel, C.B., F.R.S.

AN enormous aërolite fell on February 16, a little before 3 p.m., in a ploughed field near Alfianello, between Cremona and Brescia, sinking more than one metre in the ground, and producing a rumbling noise, heard twenty kilometres off, and a

reeling of the nearest houses as by an earthquake. Unhappily the ignorant country people, when the first fright passed, with mattocks and sticks smashed it and took away the pieces, so that Prof. Calderoni, who directly ran up from Cremona, could obtain only some little fragments for chemical analysis and for scientific cabinets.

A SCHEME is proposed for introducing electric lighting into the Canton of Vaud. The motive force would be derived from turbines of 5000 horse-power at Vallorbes, and the water supply being constant and abundant, it is believed that gas, which is very costly in Switzerland, may be entirely dispensed with throughout the district.

A VERY severe shock of earthquake was experienced in Cyprus on the morning of March 5, at 7.30, lasting about fifty or sixty seconds. At Limassol the houses swayed and rocked in the most appalling manner, and uncemented walls fell to the ground. It was impossible for foot passengers in the streets to keep their balance without assistance. The mules and horses staggered about as though in fits. It was altogether the severest shock which has been recorded for many years.

WE have received copies of the circulars just issued by the Local Scientific Societies Committee of the British Association to 324 societies, for the purpose of obtaining such information as will be useful in suggesting further action. Appended is a list of about 120 local societies which publish Proceedings.

THE Easter excursion of the Geologists' Association will be to Hythe, Romney Marsh, Sandgate, and Folkestone (March 26 and 27). On April 7 the Association will visit Westcombe Park, Greenwich; on April 14 the College of Surgeons; and on April 21 Berkhamstead and Boxmoor.

WE understand that a new weekly journal, devoted to the popular exposition of sanitary matters and to the education of the people in the laws of health, will be shortly issued by Messrs. Wyman and Sons, London. The new journal will be entitled *Health*.

THE former limits of the ice-sheet of the Glacial period appear to be still more and more extended by Russian geologists, in proportion as the post-Pliocene formations of Russia are better explored. We notice in a recent monograph on the Geology of the Volga, by M. Krotoff, that the author, who is well acquainted with this region, considers the glacial formations described by Prof. Miller in the southern parts of the province of Nijni-Novgorod, as due to the action of glaciers, and not of floating ice.

THE young Society for Caucasian History and Archaeology, founded in 1881, has already published a first fascicule of its *Bulletin*; the second will soon follow. Prof. V. Miller has published his linguistic "Osetian Studies," containing in the appendix a paper on the religious beliefs of the Osets; and Prof. Patkanoff has published the first part of his "Materials for an Armenian Dictionary," as well as a pamphlet "On the Cuneiform Inscriptions of the Van system discovered in Russia."

THE Administration of Public Instruction of the Caucasus has conceived an excellent idea which cannot be too much recommended for other countries; it is to invite schoolmasters to write descriptions of their localities, and to collect local traditions, folk-lore, &c., and to publish the papers received in the shape of a special collection. It is easy to conceive, indeed, the amount of knowledge which might be gathered in this way, and the attraction which is thrown by a scientific pursuit into the wearisome life of a schoolmaster, who is lost in a small town or village, far from intellectual centres. When he knows that his work will not be lost, and when he is supplied from an intellectual centre with the scientific works he needs, he surely will find interest in

his pursuit. This of course applies more to Russia than England. The two first parts of the collection thus started on the Caucasus wholly confirm these previsions; as is seen from an analysis of them published in the *Izvestia*, they contain, indeed, much valuable information. The descriptions of Erivan, Gori, Wakhichevan with its district, and of Chernolyesskoye village are spoken of as very useful work. Two papers, on the formation of Lake Paleostome, and a summary of all places where the Caucasus is mentioned by the ancients, are very elaborate; whilst a series of smaller papers and notes contains a variety of ethnographical sketches, folk-lore, and traditions.

LAMPART AND Co. of Augsburg are issuing in parts a third revised edition of Hellwald's "Kulturgeschichte in Ihrer Natürlichen Entwicklung bis zur Gegenwart." Trübner and Co. are the London publishers. The work will be completed in twenty parts.

AT the last meeting of the Meteorological Society of France, M. Moureaux, physicist to the Bureau Central, read a paper showing that the regimen of the rains south of the Central Plateau was independent of the meteorological conditions on the oceanic side. This communication is considered as an argument in favour of granting to the Bureau Météorologique of Algiers the privilege of being in direct communication with the other offices, and issuing warnings for the northern side of the Mediterranean.

THE additions to the Zoological Society's Gardens during the past week include a Common Seal (*Phoca vitulina*), British Seas, presented by Mr. William Whiteley; a Common Squirrel (*Sciurus vulgaris*), British, presented by Mrs. Campbell; two Prairie Grouse (*Tetrao cupido*) from North America, presented by Mr. Henry Nash; six Common Trout (*Salmo fario*), British fresh waters, presented by Mr. S. Wilson; two Common Seals (*Phoca vitulina*), British Seas, eight Prairie Grouse (*Tetrao cupido*) from North America, deposited; three Common Sheldrakes (*Tadorna vulpanser*), three Common Pintails (*Dasila acuta*), four Shovellers (*Spatula clypeata*), European, four Chilean Pintails (*Dasila spinicauda*) from Antarctic America, two Bahama Ducks (*Dasila bahamensis*) from South America, two Chiloe Wigeons (*Mareca chilensis*) from Chili, nine Summer Ducks (*Aix sponsa*) from North America, six Mandarin Ducks (*Aix galericulata*) from China, purchased; an Axis Deer (*Cervus axis* ♂), two Black Swans (*Cygnus atratus*), born in the Gardens.

#### OUR ASTRONOMICAL COLUMN

THE OBSERVATORY AT MELBOURNE.—The seventeenth annual Report of the Board of Visitors of this establishment, together with the Report of the Government astronomer, Mr. Ellery, for the year ending June 30, 1882, has just been received. The meridian work with the transit-circle was for the most part limited to observations of standard stars, for the ordinary purposes of an observatory and the determination of places of stars used for positions of comets. The 8-inch equatorial had been arranged for the observation of the small planets *Victoria* and *Sappho*, during the last autumn, according to a programme agreed upon with several European and American, and other southern observatories, with the view to another determination of the solar parallax. The large reflector was employed on celestial photography, for sketching a number of Sir John Herschel's smaller nebulae, for drawings of comet 1881, IV., &c. The nebula about  $\eta$  Argus was examined on three evenings, and was found to agree very closely with the drawing made in 1875. The majority of the smaller nebulae were found to accord well with Herschel's descriptions. Nos. 57 and 1423, however, were much fainter than Herschel indicated, and Nos. 1655 and 2181 differed considerably from his description. The positions of these nebulae for 1883.0 with Herschel's notes are as follows:—